13. OCCURRENCE OF PESTS IN SOUTHWIDE PINE SEED SOURCE STUDY

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The installation of this gigantic cooperative seed source study is one of the landmarks in the research on artificial regeneration of the southern pines. The study will indicate whether geographic races of the southern pines exist, what their geographic boundaries are, and to what extent it is safe to move seed within the boundaries of the species. Much additional information, which you might call "fringe benefits", can also come from this study.

When this project came into being, it was realized by the then Division of Forest Pathology, Bureau of Plant Industry, Soils and Agricultural Engineering, that here was a "gift from the gods" laid right in our laps. For several years we had been cognizant of the need for a study of plantation diseases. A few relatively small-scale studies had been started, but of course none approached the scope of this cooperative enterprise. Therefore we felt we'd be remiss in our duties if we failed to offer our whole-hearted participation to the Subcommittee on Geographic Source of Seed. This offer of participation was accepted by the Subcommittee. It was arranged that pathologists of the Southern and Southeastern Forest Experiment Stations would examine the bulk of the plantations in their respective territories. Based upon our meager past knowledge of plantation troubles we felt that destructive insects as well as diseases should be included. Accordingly the Forest Insect Laboratory at Gulfport was asked to and agreed to cooperate in following those plantations in the Southern Forest Experiment Station's territory. I believe that now the entomologists of the Southeastern Forest Experiment Station are likewise cooperating in this venture.

Plans call for dormant-season examinations annually for the first five years, then at the end of the seventh and tenth years, and at each fifth year thereafter; examinations to be in conjunction with the respective cooperator wherever feasible. We are now in the midst of the second annual examination.

Results

The primary result of the first examination (i.e., one year ago, at the end of the first year in the field) was that no plantation was seriously damaged by pests. Some were virtually free of the degradations of diseases and harmful insects while others were damaged to varying degrees, but the usefulness of none was seriously impaired by disease and insect pests. I am afraid, however, that such will not continue to be the case through subsequent years.

To illustrate the type of results we are obtaining and the possible implications, I would like to present some slides illustrating the more common pests and some data obtained at the end of the second year from two Gaylord Container Corporation plantations.

The two most prevalent insect pests encountered are Tetralopha robustella Zell. (the pine web worm), and Rhyacionia frustrana C the Nantucket pine tip moth).

(Slides of Tetralopha)

The insect feeds on seedlings of all four of our major pine species. Growth is most certainly retarded as a result of defoliation and in some cases this insect is apparently the direct cause of death of the seedling.

(Slides of tip moth)

This insect is particularly damaging to loblolly and shortleaf seedlings. By killing back the terminal and lateral shoots it causes the seedling to assume a much-branched, ragged form, precluding the prediction of future form class from juvenile stock.

(Slides of fusiform rust)

Among the diseases, the fusiform rust (Cronartium fusiforme (Pk.) Hedgc. and Hunt) of slash and loblolly seedlings is the most important, especially as the brown spot needle blight disease of longleaf is controlled in these plantations by spraying. The rust varies greatly in intensity between plantations but can cause serious losses through the malformation and death of affected young plants.

(Slides of Pales weevil (Hylobius pales Host.))

This weevil commonly attacks pine seedlings planted in an area from which older pine trees have just been removed. It has been a minor pest in the seed source study but is one that must be contended with in the establishment of progeny testing areas on recently cut-over land.

We are sorely in need of control measures for the Nantucket tip moth and the pales weevil.

(Slide of data)

1. Loblolly Series 2. These data are not meant to be representative of the entire Southwide Study but merely present the picture as it occurs with a selected series in two Gulf-area plantations, with mention of some possible implications. The two plantings are at about the same latitude and possibly forty miles apart.

Let us note first (Table 1) the data in column 3, i.e., the percent of living seedlings infected with fusiform rust by the end of the second season in the plantations. It is evident that on the average there is less fusiform rust in the Mississippi planting than in the Louisiana one. Note however that the upper-listed five seed lots in both plantings and the upper six in the Louisiana one show the most rust infection. These six lots are from east of the Mississippi River, while the other three are from near or west of the River. At present, this is just an indication, but with the same general tendency toward rust susceptibility exhibited in Wakeley's 1926 test.

Tip moth infection, shown in column 4, is fairly high throughout; averaging fifty-five percent of the individuals in the Mississippi plantation and forty-three percent in the Louisiana one. There are no evident differences in susceptibility to this insect between the various seed sources. However, there is a possibility that some seed lots will recover with less permanent growth defects than others.

Again with Tetralopha, there are no large differences between plantations or between seed sources.

Table 1. Loblolly Series 2, end of second year in plantation

Seed Source		Pearl River County, Miss.					Washington Parish, La.				
				Affected by:					Affected by:		
No.	County and State of Origin	Survival	Height	Fusiform rust	Tip moth	Tetralopha	Survival	Height	Fusiform rust	Tip moth	Tetralopha
		Percent	Feet	-.-.-.-Percent-.-.-.-			Percent	Feet	-.-.-.-Percent-.-.-.-		
303	Onslow, N. C.	91	2.1	7	67	10	94	3.9	21	46	10
307	Newberry, S. C.	97	2.2	8	59	16	89	3.3	15	50	17
311	Clarke, Ga.	95	2.3	14	65	6	95	3.2	16	41	13
331	Spalding, Ga.	88	1.6	9	32	14	94	3.4	20	46	11
317	Clay, Ala.	90	1.8	10	54	14	90	3.0	19	42	11
321	Prentiss, Miss.	95	1.8	3	52	16	88	3.0	12	41	13
323	Livingston, La.	90	2.1	6	68	8	89	2.9	2	36	13
327	Clark, Ark.	89	1.4	0	49	24	87	3.1	5	45	13
329	Hardemann, Tenn.	89	1.5	3	44	23	88	2.6	6	36	17
Average		92	1.9	7	55	15	90	3.2	13	43	13

Table 2. Slash Series 1, end of second year in plantation

Seed Source		Pearl River County, Miss.					Washington Parish, La.				
				Affected by:					Affected by:		
No.	County and State of Origin	Survival	Height	Fusiform rust	Tip moth	Tetralopha	Survival	Height	Fusiform rust	Tip moth	Tetralopha
		Percent	Feet	-.-.-Percent-.-.-			Percent	Feet	-.-.-Percent-.-.-		
201	Colletin, S. C.	86	1.8	5	4	14	81	2.9	25	2	12
203	Baker, Fla.	82	1.5	5	2	24	83	3.2	39	2	21
205	Polk, Fla.	86	1.4	1	1	21	-	-	-	-	-
207	Monroe, Ala.	84	1.6	5	1	23	84	3.1	28	-	-
209	Harrison, Miss.	93	2.1	4	3	14	-	-	-	-	-
211	St. Tammany, La.	81	2.0	3	1	14	73	2.6	28	2	23
Average		85	1.7	4	2	18	80	3.0	30	2	19

(Slide of Data)

2. Slash Series 1. These data (Table 2) are from the slash pine series at the same two plantations as above.

Fusiform rust is quite low at the Mississippi site with no differences between seed sources with the possible exception of the very low reading (one percent) for the Polk County, Florida source; however, seedlings from this source resemble the "South Florida" slash more than the true slash pine. Infection is quite high at the Louisiana plantation; considerably higher than on loblolly. The only difference between seed sources is possibly the quite high (thirty-nine percent) infection of the Baker County, Florida source compared with the others (twenty-five to twenty-eight percent). Previous studies with slash pine have failed to show differences in rust susceptibility attributable to the geographic source of the seed.

In conclusion, I believe that by following the occurrence of disease and insect pests in this Southwide Pine Seed Source Study we will not only learn which pests are the most serious but will gain much needed knowledge about their habits, life histories, and host range, and always stand the chance of finding a resistant or tolerant race or strain of the host.